Topic 1 Equations

1. Which one of the following equations best represents the reaction between iron and hydrochloric acid?

A $Fe + HCl \Rightarrow FeCl + H$

B $Fe + HCl \Rightarrow FeCl + \frac{1}{2} H_2$

C $Fe + 2\ HCl \Rightarrow FeCl_2 + H_2$

D $Fe + 2\ HCl \Rightarrow FeCl_2 + 2\ H$

2. What numerical value of **Q** is required to balance the equation below?

$$2\ H_2S + \mathbf{Q}\ O_2 \Rightarrow 2\ SO_2 + 2\ H_2O$$

A 2

B 3

C 4

D 6

3. The equation for the reaction of sodium sulfate with barium nitrate to form a precipitate of barium sulfate is

$$Ba(NO_3)_2 + Na_2SO_4 \Rightarrow BaSO_4 + 2\ NaNO_3$$

Which one of the following is the correct ionic equation for this reaction?

A $Ba^{2+} + SO_4^{2-} \Rightarrow BaSO_4$

B $Na^+ + NO_3^- \Rightarrow NaNO_3$

C $Ba^{2+} + Na_2SO_4 \Rightarrow BaSO_4 + 2\ Na^+$

D $Ba(NO_3)_2 + SO_4^{2-} \Rightarrow BaSO_4 + 2\ NO_3^-$

4. Write in numbers, in front of the formulae, to balance the following equations.

a) $CaO + HNO_3 \Rightarrow Ca(NO_3)_2 + H_2O$

b) $NH_3 + H_2SO_4 \Rightarrow (NH_4)_2SO_4$

c) $HCl + ZnCO_3 \Rightarrow ZnCl_2 + H_2O + CO_2$

d) $SO_2 + Mg \Rightarrow S + MgO$

e) $Fe_3O_4 + H_2 \Rightarrow Fe + H_2O$

f) $K + C_2H_5OH \Rightarrow KC_2H_5O + H_2$

g) $Fe(OH)_3 \Rightarrow Fe_2O_3 + H_2O$

h) $CH_3CO_2H + O_2 \Rightarrow CO_2 + H_2O$

i) $Pb(NO_3)_2 \Rightarrow PbO + NO_2 + O_2$

j) $NaMnO_4 + HCl \Rightarrow NaCl + MnCl_2 + Cl_2 + H_2O$

5. Write balanced equations for the following reactions.

a) Copper carbonate forming copper oxide and carbon dioxide.

b) Nickel oxide reacting with sulfuric acid to form nickel sulfate and water.

c) Iron and bromine reacting to give iron(III) bromide.

d) Lead(IV) oxide and carbon monoxide forming lead metal and carbon dioxide.

e) Iron(II) chloride reacting with chlorine to form iron(III) chloride.

f) Ethanol burning in air to form carbon dioxide and water.

g) Silver reacting with nitric acid to form silver nitrate, nitrogen dioxide and water.

h) Manganese(IV) oxide reacting with hydrochloric acid to form manganese(II) chloride, chlorine and water.

i) Sulfur dioxide reacting with hydrogen sulfide to form sulfur and water.

j) Ammonia reacting with oxygen to form nitrogen monoxide and water.